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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MARIAM, DANIEL G	

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 03/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/688,205	MILLGAN ET AL.	
	Examiner	Art Unit	
	DANIEL G MARIAM	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☒ Claim(s) *9 and 10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 October 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 9 and 10 are objected to because of the following informalities: the limitation "SMD" recited in both claims 9 and 10 should be preceded by it's meaning. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 recites the limitation "the four sides" in line 12. A similar limitation also occurs in claim 13. There is insufficient antecedent basis for this limitation in the claims.

Since claims 2-7 and 14-19 directly or indirectly depend on claims 1 and 13 respectively, they are also rejected under 35 U.S.C. 112, second paragraph, for the same reason set forth above for claims 1 and 13.

4. Claim 9 recites the limitation "the abstract model and the SMD" in line 1 and 2 respectively. A similar limitation also occurs in claim 10. There is insufficient antecedent basis for these limitations in the claims.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4, 7, 11-16, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki, et al. (4,504,969).

With regard to claim 1, Suzuki, et al. a method comprising: receiving an image (a memory receives an image of an original document read by an image reader, such as a scanner: See col. 2, line 67 through col. 3, line 3); identifying boundary data objects in the image, each boundary data object representing a point in the image having a specified orientation, i.e., horizontal (or row) and vertical (or column) (See for example, Fig. 3); selecting a primary angle that describes a potential orientation of a generally rectangular shaped object in the image (which corresponds to segments that are located in the vertical (or column) direction ((See items 1L, 1R; 2L, 2R; and 3L, 3R, of the rectangular features of items I, II, and III respectively, in Fig. 3). Please note, the features illustrated in Figure 3 are in direct agreement with applicant's own description of the claimed feature, where applicant says: "The angle of orientation of the longer, "dominant," edge of the rectangle is considered to be the primary angle of the rectangle" (See page 5, lines 20-21 of the specification)); finding a first set of lines defined by groups of boundary data objects that lie generally along the direction of the primary angle (see for example, Figs. 3 and 5); finding a second set of lines defined by groups of boundary data objects that lie generally along a direction orthogonal to the primary angle (which corresponds to segments that are located in the horizontal (or row) direction (See items 1U, 1D; 2U, 2D; and 3U, 3D, of the rectangular features of items I, II, and III respectively, in Fig. 3. the features illustrated in Figure 3 are in direct agreement with applicant's own description of the claimed feature, where applicant says: "The angle of orientation of the other edge of the rectangle is considered to be the secondary angle of the rectangle" (See page 5, lines 21-23 of the

specification); and locating pairs of lines from the first set of lines and pairs of lines from the second set of lines that together form the four sides of the generally rectangular shaped object (See For example, Figs. 3, and 5-7; and col. 3, lines 53-58).

With regard to claim 2, the method of claim 1, wherein finding the first set of lines includes assigning a score value, i.e., given the broadest reasonable interpretation, this feature reads on the judgment made by Suziki, et al whether a segment/s belongs to the side of the rectangle based on the presence or absence of solid segment/s, to each line in the first set of lines based on the likelihood that each said line corresponds to a side of the rectangle (See for example, Fig. 5; and col. 8, lines 30-37).

With regard to claim 3, the method of claim 2, wherein the score value for each said line is computed based on the number of boundary data objects contributing to the line (See for example, Fig. 5).

With regard to claim 4, the method of claim 3, wherein the score values are used in locating the pairs of lines that form the four sides of the generally rectangular shaped object (See for example, Fig. 5; and Table 5).

With regard to claim 7, the method of claim 1, further including: successively incrementing the primary angle (which reads on items 2L, 2R and 3L, 3R, of the additional rectangles, in Fig. 3) and repeating the acts of finding the first set of lines, finding the second set of lines, and locating the pairs of lines for each said increment of the primary angle, wherein rectangles corresponding to the generally rectangular shaped object are located in any of the increments of the primary angle (See for example, Figs. 3 and 5).

With regard to claim 11, a computer system comprising: a processor; and a computer memory, the computer memory containing at least one image of an object having a generally rectangular shape and containing computer instructions (See for example, item 200, in Figs. 2 & 8), which, when executed by the processor (See for example, items 301-303, in Fig. 2 and 8), identifies boundary data objects, based on the image of the object, at a primary angle, i.e., line/segment located in the column direction, and at an angle orthogonal to the primary angle, i.e., line/segment located in the row direction, and locates pairs of parallel lines in each of the primary angle and the angle orthogonal to the primary angle (See items I, II, and III, in Figs. 3 and 5); wherein the computer system identifies edges of a rectangle generally describing the rectangular shaped object based on the pair of parallel lines (See for example, col. 3, lines 53-58).

With regard to claim 12, the computer system of claim 11, further including an image formation unit connected to the processor and configured to generate the at least one image (See for example, item 401-403, in Figs. 2 and 8).

With regard to claim 13, claim 1 substantially encompasses the limitation (functional steps) recited in this claim. Thus, argument analogous to that presented above for claim 1 is applicable to claim 13. Suzuki, et al further discloses a computer readable medium containing computer instructions, that when executed by a processor performs the function recited in this claim (See both Figs. 2 and 8).

Claim 14 is rejected the same as claim 2. Thus, argument analogous to that presented above for claim 2 is equally applicable to claim 14.

Claim 15 is rejected the same as claim 3. Thus, argument analogous to that presented above for claim 3 is equally applicable to claim 15.

Claims 16 and 19 are rejected the same as claims 4 and 7 respectively. Thus, argument analogous to those presented above for claims 4 and 7 are respectively applicable to claims 16 and 19.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 8 and are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarachik (6,078,700) in view of Suzuki, et al. (4,504,969).

With regard to claim 8, Sarachik discloses a method comprising: receiving an image of a surface mounted device (SMD) for a printed circuit board, the SMD having a generally rectangular shape (See for example, col. 5, lines 25-54); automatically generating an abstract model of the SMD based on the received image the abstract model (including at least the length and width of dominate edges in the SMD that contribute to the rectangular shape of the SMD), and training an object location algorithm, based on the generated abstract model, to locate, i.e., the SMD in succeeding images, i.e., image feature finder (See for example, col. 5, line 55 through col. 6, line 57).

While Sarachik does states: "The grouping technique for searching for correspondence between model features and image features involves using a small, selected subset of image features. The image features selected for determining correspondence with model features are ones that are most likely to belong to a subset of a set of features comprising the model. For example, a vision system might be implemented in an application wherein it is desirable to find a particular rectangular object in the scene or image, e.g. a microchip. Although the captured image contains many objects, grouping could be applied by having the vision system select all groups of line segments from the image, and more particularly all groups of line segments that are at right angles to each other. The subsets or smaller groups of features, e.g. line segments at right angles to each other, would then be used to match to the chip model, rather than using the entire set of line segments" (See col. 2, lines 50-65). Sarachik does not elaborate and/or explicitly use the language that the model being comprised of at least the length and width of dominate edges in the SMD that contribute to the rectangular shape of the SMD, even though it is obvious that such a model does generally use edges or lines in the manner claimed to form the rectangular shape of the model. Nonetheless, Suzuki, et al. (Figs. 3 and 5) teaches this feature.

Sarachik and Suzuki, et al. are combinable because they are from the same field of endeavor, i.e., rectangular pattern recognition (See for example, col. 1, lines 23-31). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Suzuki, et al. with Sarachik. The motivation for doing so is to employ segments or edges that describe the length and width, i.e., column and row respectively, of dominant edges or lines, and to do so would at least aid in the creation and/or accurate identification of the

rectangular shape. Therefore, it would have been obvious to combine Sarachik with Suzuki, et al. to obtain the invention as specified in claim 8.

9. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki, et al. (4,504,969) in view of Sarachik (6,078,700).

With regard to claim 9, Suzuki, et al. discloses all of the claimed subject matter as already discussed above in paragraph 6, and the arguments are not repeated herein, but are incorporated by reference. Suzuki, et al does not explicitly call for wherein the abstract model additionally includes position and orientation information of the SMD in the received image. However, Sarachik (col. 5, lines 25-54; and Fig. 2) teaches this feature. Therefore, it would have been obvious to one having ordinary skill in the art to incorporate the teaching as taught by Sarachik into the system of Suzuki, et al if for no other reason than to utilize an SMD image instead of a document image, and to create the model of the SMD image, and finding an SMD image using the model.

With regard to claim 10, the method of claim 1, wherein automatically generating the abstract model additional comprises: extracting boundary data objects in the image, each boundary data object representing a point in the image (See Figs. 3 and 5 of Suzuki, et al.); selecting a primary angle, i.e., line/segment in column direction, that describes a potential orientation of the SMD (See Figs. 3 and 5 of Suzuki, et al; and Fig. 2 of Sarachik); finding a first set of lines defined by groups of boundary data objects that lie generally along the direction of the primary angle (See Figs. 3 and 5 of Suzuki, et al); finding a second set of lines defined by groups of boundary data objects that lie generally along a direction orthogonal, i.e., line/segment in a row direction, to the primary angle (See Figs. 3 and 5 of Suzuki, et al.); and locating pairs of

lines from the first set of lines and pairs of lines from the second set of lines that together form the dominant edges in the SMD (See for example, col. 3, lines 53-58 Suzuki, et al.; and Fig. 2 of Sarachik).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent Numbers: 5189707, 5371690, 5574801, 5694482, and 6549648; and a Publication to Brito, et al. discloses "Segmentation strategies with multiple analysis for an SMD object recognition system".

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL G MARIAM whose telephone number is 703-305-4010. The examiner can normally be reached on M-F (7:00-4:30) FIRST FRIDAY OFF.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, LEO BOUDREAU can be reached on 703-305-4607. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DANIEL MARIAM
PRIMARY EXAMINER
March 10, 2004